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Confined Space Entry Program

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**H-1112-1 SAFETY AND HEALTH MANAGEMENT**

**Safety and Health Program  
Confined Space Entry Program  
United States Department of the Interior  
BUREAU OF LAND MANAGEMENT  
OREGON STATE OFFICE**

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**SAFETY AND HEALTH PROGRAM  
CONFINED SPACE ENTRY PROGRAM**

OR/WA Supplement to BLM Manual Handbook H-1112-1  
Safety and Health Management

**JUNE 2004  
Oregon State Office**

## H-1112-1 SAFETY AND HEALTH MANAGEMENT

### 16.10.1 Policy, Statement and Purpose

The Oregon/Washington Bureau of Land Management (BLM) is committed to providing a safe and healthful work environment for all employees. The agency has various work procedures in place (administrative and engineering controls, work practice designs, and requirements for the use of personal protective equipment [PPE]), which assist in reducing employee exposure to hazards on the job. Comprehensive job training and the consistent use of all identified safe work procedures and PPE is critical to employee safety.

This policy establishes procedures to protect employees and contractors hired by the agency from the hazards that may be present when confined space entry is required. Entry into confined spaces may be necessary to provide maintenance, inspection and/or other work activities that can expose workers to a dangerous and unhealthful working environment. A formal, comprehensive Risk Assessment (RA) will be completed prior to any employee entry into a confined space.

The Occupational Safety and Health Administration (OSHA) requires that any employer who allows worker entry into a permit space must develop and implement a written program for the space. *It is the policy of the Oregon/Washington State BLM that NO employee will enter a permit-required confined space (PRCS)*, also known as a permit-space. All work required in these areas will be provided on a contractual basis only. All contracted work in any PRCS must adhere to the requirements of 29 CFR 1910.146 and BLM contractual specifications. Primary applicable standards, manuals, handbooks and state references are listed below.

- 29 CFR 1960 - *Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters*
- 29 CFR 1910.146 - *Permit-Required Confined Spaces*
- Department Manual Part 485 - *Safety and Occupational Health Program*
- BLM Manual 1112 - *Safety & Health Handbook*
- BLM Manual Handbook 1112-1 - *Safety and Health Management*
- Oregon Administrative Rules-OR-OSHA §1910.146 *Permit-Required Confined Spaces*
- General Occupational Health standards, *Chapter 296-62-141 WAC-Part M Confined Spaces* (Washington Industrial Safety & Health Act – WISHA)

The intent of this program is to provide general information and guidance to enable all employees to recognize a confined space, to ensure the understanding of various types of hazards associated with such spaces, and, to outline the responsibilities of all employees who work near areas where confined spaces exist. Additional information is provided regarding entry permit requirements and contractor responsibilities to assist agency liaisons (contracting officer representatives, safety managers, etc.) to fulfill responsibilities.

This policy provides a template for the confined space entry program and may be supplemented as necessary to ensure that district office policies are site-specific to operational needs.

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This policy applies to any employee who *may* be required to enter some type of confined space (non-permit) to perform maintenance or repair tasks; or, who may serve as a contract officer representative (COR) when contractors are performing work in or around *any* type of confined space. *It is recommended that BLM employees do not enter **any** confined space, regardless of designation.* It is further recommended that all necessary work in such spaces be performed on a contractual basis.

**16.10.3 Roles and Responsibilities**

Managers and supervisors, in cooperation with the District Safety Manager, and the contracting officer representative (COR), are responsible for implementing and administering the Confined Space Entry Program. Specific responsibility includes ensuring that:

- No BLM employee enters a permit-required confined space (PRCS)
- Entry into a confined space [non-permit] by an employee will be accompanied by an approved Risk Assessment [All requirements of 29CFR 1910.146 Permit Required Confined Spaces – Appendix D *Entry Permit* must be applied.]
- All confined spaces are identified and an inventory is created and updated annually
- All employees involved in confined space entry or who work in an area containing confined spaces receive appropriate training
- All confined spaces are posted as required
- All documentation relating to the confined space entry program is complete and accurate
- All confined space equipment and personal protective equipment (PPE) is available and testing requirements have been met for various testing instruments
- Rescue team services are identified and available as required
- Contractors must meet the minimum requirements of 29 CFR 1910.146 prior to entry into a permit-required confined space<sup>1</sup>

Only those employees who are properly trained and certified in confined space entry requirements are authorized to engage in such activities. All employees must understand the requirements of the confined space program and abide by safe work practices when these procedures are used in the work area.

Failure to follow these procedures is considered a serious safety violation and may result in disciplinary action.

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<sup>1</sup> Reference 16.10.4 *Contractor Confined Space Entry*

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### 16.10.4 Confined Space – General Information

Many workplaces contain spaces that are considered confined because their configurations hinder the activities of any employee(s) who must enter, work in, and exit these spaces. A good example is when an employee must work in an area where they must squeeze in and out through narrow openings to perform inspection, repair and/or maintenance tasks in cramped conditions. Examples of such areas are tanks (fuel or water), storage bins, vaults, tunnels, sewers, crawl spaces, or almost any underground area. OSHA uses the term *confined space* to describe such spaces.<sup>2</sup>

There are many instances where individuals who work in confined spaces face the increased risk of exposure to serious hazards. In some cases, confinement itself poses entrapment hazards. In other situations, confined space work, by its very nature, keeps workers closer to hazards, such as asphyxiating atmospheres or the moving parts of machinery. A permit-required confined space (or *permit space*) is defined as hazardous when it has a dangerous shape or design, could contain gases or chemicals, could have other physical hazards, or could contain too little or too much oxygen.

A confined space is defined as an enclosed space:

- Large enough or so configured that an employee can bodily enter and perform assigned work
- Which is not designed for continuous employee occupancy
- With limited or restricted means for entry or exit

A permit-required confined space (*permit space*) is a confined space that also contains one or more of the following characteristics:<sup>3</sup>

- A hazardous atmosphere or a known potential to contain a hazardous atmosphere;
- A material with the potential to engulf an entrant; e.g., grain, ore, sand, water, etc.;
- An internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or a floor that slopes downward and tapers to a smaller cross section; or,
- Any other recognized serious safety or health hazard

### Confined Space Hazards

The many hazards encountered when entering and performing work in confined spaces may cause bodily injury, illness, and even death. Many times, accidents occur among workers because of the failure to recognize a confined space situation and the potential hazards posed. Hazards specific to a confined space are dictated by: (1) the material stored or used in the confined space; (2) the activity carried out in the space; or, (3) the external environment.

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<sup>2</sup> Gullies, washes, depressions in terrain, drainage pipes, and other areas typically considered 'open areas' may also contain fumes heavier than air and may constitute a hazardous environment even though they are not considered a confined space in the classic sense. [These fumes may or may not be considered hazardous but may displace available oxygen.]

<sup>3</sup> Reference Section 16.10.5 *Confined Space – General Requirements*.

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A. Hazardous atmospheres encountered in confined spaces can be divided into four distinct categories: flammable, toxic, irritant and/or corrosive, and asphyxiating.

1. A flammable atmosphere generally arises from enriched oxygen atmospheres, vaporization of flammable liquids, byproducts of work, chemical reactions, or concentrations of combustible dusts. An atmosphere becomes flammable when the ratio of oxygen to combustible material in the air is neither too rich nor too lean for combustion to occur. Combustible gases or vapors will accumulate when there is inadequate ventilation in a space. Specific kinds of work such as spray painting can result in the release of explosive gases or vapors. Welding in a confined space is a major cause of explosions in areas that contain combustible gas.

2. The substances to be regarded as toxic in a confined space can cover the entire spectrum of gases, vapors, and finely-divided airborne dust. Sources of toxic atmospheres encountered may arise from various manufacturing processes (e.g., the production of hydrogen chloride); the product stored in the space; or, the operation performed in the area (e.g., welding or brazing with metals capable of producing toxic fumes).

Carbon monoxide (CO) is a hazardous gas that may build up in a confined space. This odorless, colorless gas is formed from incomplete combustion of organic materials such as wood, coal, gas, oil and gasoline. CO is a relatively abundant gas and any untested atmosphere must be suspect. Thus, CO must be tested for specifically. The formation of CO may result from chemical reactions or work activities. Inadequate ventilation efforts can easily cause fatal incidents.

3. Irritant or corrosive atmospheres can be divided into primary and secondary groups. The primary irritants exert no systemic toxic effects (effects on the entire body). Examples of primary irritants are chlorine, ozone, hydrochloric acid, hydrofluoric acid, sulfuric acid, nitrogen dioxide, ammonia, and sulfur dioxide. A secondary irritant is one that may produce systemic toxic effects in addition to surface irritation. Examples of secondary irritants include benzene, carbon tetrachloride, and ethyl chloride.

Irritant gases vary widely among all areas of industrial activity. They can be found in chemical plants, the petroleum industry, refrigeration industries, paint manufacturing, and mining operations. Prolonged exposure at irritant or corrosive concentrations in a confined space may produce little or no evidence of irritation. The danger exists in that the worker is usually not aware of any increase in exposure to toxic substances.

4. Asphyxiating atmospheres. The normal atmosphere is composed of approximately 20.9% oxygen and 78.1% nitrogen, and 1% argon with small amounts of various other gases. Reduction of oxygen in a confined space may be the result of either consumption or displacement. The consumption of oxygen takes place during combustion of flammable substances, as in welding, heating, cutting, and brazing. A more subtle consumption of oxygen occurs during bacterial action. Displacement of air

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can occur by various other gases. Carbon dioxide may be used to displace air and can occur naturally in sewers, storage bins, wells, tunnels, and grain elevators. Any gas which is heavier than air may lie in a tank or manhole for hours or days after opening. These gases are colorless and odorless and therefore pose an immediate hazard to health unless appropriate oxygen measurements and ventilation techniques are applied. Oxygen deprivation is one form of asphyxiation.<sup>4</sup>

### B. General Safety Hazards

1. Mechanical/Electrical. If activation of electrical or mechanical equipment would cause injury, each piece of equipment should be manually isolated to prevent inadvertent activation before workers enter or while work is in progress. (Refer to the *OR/WA Control of Hazardous Energy Program* for information regarding lock out and tag out procedures.)
2. Communication Concerns. Communication between the worker inside a confined space and the standby person outside is of utmost importance. If the worker should suddenly feel distressed and not be able to summon help, an injury could become a fatality. When visual monitoring is not possible, a voice or alarm-activated type of communication is recommended.
3. Entry and Exit. It is important to determine the type of confined space to be entered, access to the entrance, the number and size of openings, barriers within the space, and the time requirement for exiting.
4. Physical hazards may include thermal risks (heat), liquids or gases entering a space, slips and falls, and excessive noise.

Note: Some physical hazards cannot be eliminated due to the nature of the confined space or the work to be performed. These hazards include such items as surface residues and structural configurations. Surface residues in confined spaces can increase the already hazardous conditions of electrical shock and bodily injury due to slips and falls. Structural hazards such as baffles, trays, bends in tunnels, and overhead structural members installed for maintenance are exacerbated by the physical surroundings in a confined space. Workers must review and enforce safety precautions carefully in all these types of situations.

### Hazard Assessment and Control

A hazard assessment must be completed prior to any entry into a confined space. The hazard assessment should identify the sequence of work to be performed in the confined space, the specific hazards known or anticipated, and the control measures to be implemented to eliminate or reduce each of the hazards to an acceptable level. No entry should be permitted until the hazard assessment has been reviewed and discussed by all individuals engaged in the activity. All workers who enter confined spaces should be informed of known or potential hazards associated with the space to be entered.

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<sup>4</sup> Reference Appendix A-1 *Specific Requirements – Oxygen in Confined Spaces*

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Hazard controls include changes in the work processes and/or working environment with the objective of controlling the health hazards either by eliminating the responsible agents, by reducing health hazards below harmful levels, or by preventing the contaminants from coming into contact with workers.

- Engineering controls are those controls which eliminate or reduce the hazards through implementation of sound engineering practices. Controls such as ventilation to limit worker exposure, or temporary ventilation and lighting must be applied first.
- Work practice (administrative) controls are those controls which eliminate or reduce the hazard through changes in the work practices [e.g. rotating workers, reducing the amount of worker exposure, and good housekeeping efforts]. Confined spaces should be cleaned and/or decontaminated of hazardous materials to the extent feasible prior to entry. Examples of good work practices controls are such procedures as wetting of hazardous dusts, posted of warning signs, application of specific entry and rescue procedures, the use of lockout/tag out procedures, employee training, and atmospheric monitoring.
- If the hazard cannot be eliminated or reduced to a safe level through engineering and/or work practice controls, personal protective equipment (PPE) must be used by employees.

In addition to personal protective equipment, other equipment that employees will likely require for safe entry procedures includes testing, monitoring, ventilating, communications and lighting equipment; barriers and shields; ladders; and various types of retrieval devices.

It may be necessary to re-evaluate hazards based on possible changes in activities, and/or the physical or environmental conditions which could adversely affect work in a confined space. A master inventory of confined spaces must be maintained.<sup>5</sup> Any change in designation of a confined space must be reviewed carefully.

If hazardous conditions are detected during entry, employees must immediately exit the space until such time as the space is re-evaluated to determine the nature of the hazards and safe entry procedures are developed.

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<sup>5</sup> Refer to Section 16.10.5 – *Confined Space – General Requirements*



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### 16.10.5 Confined Space – General Requirements

#### Confined Space Inventory

All workplaces within the OR/WA BLM will be surveyed to identify confined spaces which may present hazards to employees. (Reference Illustration 1 – Confined Space Inventory Form) This survey must be reviewed annually to ensure that all spaces are identified. At a minimum the inventory form must state the following:

- The location and description of the confined space
- Classification of the space (non-permit, permit-required, **or** hazardous non-entry)
- If the space is entered/frequency of entry activities
- Identification of workers (employee or contractor) who will enter the space/type of work performed

#### Confined Space Classification

Non-Permit Required Confined spaces receiving this classification do not contain or have the potential to contain any hazard capable of causing death; or, all of the hazards in the space have been eliminated. ***None of the characteristics of a permit required space are present.***

Permit Required If the space has *any* one of the following characteristics (hazards) the space **must** be classified as a permit required confined space.

- Contains a material which has the potential to engulf an entrant
- Has an internal configuration that tapers to a smaller cross section (sloped floor) which may trap or asphyxiate an entrant
- Contains an immediately dangerous to life and health (IDLH) atmosphere
- Contains an airborne concentration of a hazardous chemical above the permissible exposure limit (PEL) which cannot be controlled by forced air ventilation alone
- Contains any other recognized serious safety or health hazards

*Rescue Classification.* Permit required confined spaces may also be also classified on the basis of rescue service requirements. High hazard spaces require ‘*Rescue Standby (RS)*.’ Examples of spaces and conditions which require RS include entries during which entrants are required to wear supplied air breathing apparatus (self-contained breathing apparatus [SCBA]; an environment in which there is a documented or potential immediately dangerous to life and health (IDLH) atmosphere, and spaces in which an entrant would be expected to have difficulty with self-rescue.

Spaces which present a moderate to low hazard to entrants are classified as requiring ‘*Rescue Availability (RA)*.’ For example, these are spaces which do not expose entrants to a toxic atmosphere, thereby requiring breathing apparatus.

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Hazardous Non-Entry Confined spaces which meet the definition of permit required, but which will not be entered at all, are classified as hazardous non-entry. These spaces must be posted with warning signs.

**Confined Space Reclassification**

Confined spaces may be reclassified following carefully evaluation by the Safety Manager with assistance from industry specialists, if required. The confined space inventory will be documented to show the date of reclassification and explanatory notes. Signage must be reevaluated and updated as necessary.<sup>6</sup> An example of a condition that may require the reclassification of a non-permit confined space to a permit-required confined space can be a change in work activities and/or other physical or environmental conditions, which could adversely affect work.

**Confined Space Posting**

All permit required and hazardous non-entry confined spaces identified in the site inventory must be posted with appropriate warning signs and specify a contact for additional information. Refer to the example below.

<p style="text-align: center;"><b>DANGER</b> <b>Permit Required Confined Space</b> <b>Do Not Enter Without a Written Permit</b> <b>Contact: _____</b></p>
<p style="text-align: center;"><b>DANGER</b> <b>Hazardous Non-Entry Confined Space</b> <b>Do Not Enter</b> <b>Contact: _____</b></p>

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<sup>6</sup> OSHA regulations allow permit spaces to be reclassified as non-permit spaces only by the total elimination of all hazards.

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### Confined Space Training Requirements

Employees who are affected by this Confined Space Entry Program (employees who work around such spaces; employees who *may*, on occasion, be required to enter a non-permit space; employees who perform contract work inspections; and, contract employees) must receive training to develop the knowledge, skills and ability to safely work in and around confined spaces. The contractor is responsible for providing training to designated workers and to provide documentation of this training to the agency. OSHA requires training be provided as follows:

- For all employees who work around confined spaces
- Before any worker is first assigned to confined space entry duties (entrant, attendant, or supervisor) (Reference Section 16.10.6 - Contractor Confined Space Entry)
- Before there is a change in assigned duties for any employee working around confined spaces
- When there is a change in permit space operations that present new hazards or requires a change in procedures (not previously covered in training information)
- To maintain employee level of knowledge, skill and ability on an ongoing basis

Specific training is required for authorized entrants, attendants, and entry supervisors.<sup>7</sup> Refresher training is conducted as needed to maintain employee competence in entry procedures and safety precautions. The *entry supervisor* has overall responsibility for entry operations. The *attendant* is responsible for closely monitoring conditions in the space and the activity of the entrant. The *entrant* is responsible for safely performing work activity within the confined space. In general, training must include information regarding the following:

- Duties and responsibilities as a member of the confined space entry team
- Confined space hazards, the signs of and symptoms from such hazards, and the results of dangerous exposure
- Entry permit procedures, including monitoring and testing protocols
- Knowledge of various testing equipment, sampling strategies and techniques, and calibration requirements
- Communications, rescue plan and rescue methods and procedures, including equipment use (to include 1<sup>st</sup> aid and CPR skill requirements as well as the use of appropriate PPE)
- The knowledge and skills required to work safely in a confined space

Training records must be maintained by the employer for three years subsequent to the initial training period. Records should show the date of the training session, a summary of the curriculum, the names and qualifications of individual trainers, and, attendee names and job titles.

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<sup>7</sup> The training required depends on the specific permit space to be entered and the procedures which are needed to protect entrants. The information provided in this program is a generalization of the topics which are required for employee training, dependent upon roles and responsibilities. (Reference Appendix B-1 Confined Space Entry – Assigned Duties)

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BLM employees will *not* enter permit required confined spaces. All required work will be performed on a contractual basis. The agency is responsible to inform the contractor that permit space entry is allowed *only* through compliance with the elements of a permit required confined space program that meets Federal OSHA requirements as well as any applicable State OSHA requirements specific to the contractor. Prior to start of work, the agency (COR) will ensure that the contractor has a documented plan for permit space entry and that all required training has been provided for workers.

The contractor is responsible to inform the agency (designated COR and/or District Safety Manager) of the contents of their plan inclusive of the rescue procedures that will be followed if required. The agency will inform the contractor of all identified hazards associated with the confined space to be entered as well as any procedures that have been implemented to protect employees working near the space. All entry procedures will be coordinated. Communication efforts between the agency and the contractor are considered vital to a safe operation and must be on a continuing basis.

The contractor is responsible to contact the agency liaison upon completion of work in the space and ensure that the entry permit is cancelled. If a condition changes within the space during the performance of work, all contract employees should exit the space immediately and report [debrief] to the contract supervisor and the BLM COR/Safety Manager.

**16.10.7 Permit Space Entry Requirements – General Information**

Entry Permit Requirements The entry permit is the major tool in assuring safety for workers during entry in confined spaces with known hazards or with unknown or potentially hazardous atmospheres. The permit process guides the supervisor and workers through a systematic evaluation of the space to be entered. Specific information is required to be displayed on the entry permit. (Reference Illustration 5 – Example A and Illustration 6 – Example B – Confined Space Permits) The permit is completed by a qualified person and information is shared with all employees involved in the operation. The permit must be posted at or near the work location. Each permit is valid ONLY for the specific date on the permit. All permits must be retained for at least one year. Only authorized entrants can enter and work in a permit-required confined space. Each entrant must know how to work safely in the space. The entry supervisor is responsible to terminate the permit following complete of work, or, when new conditions exist in the space.

The permit, signed by the entry supervisor, identifies the:

- Space and its hazards
- Reason for entering the space and acceptable entry conditions
- Permit date and length of time it applies
- What was done to isolate, remove, or control hazards (ventilation efforts, Lockout/Tagout procedures)
- Testing results and equipment used to test and monitor the atmosphere
- Names of authorized entrants, attendants, and entry supervisor(s)
- How employees will communicate with others inside and outside the space
- Rescue procedures and equipment available for use
- The personal protective equipment authorized entrants must use

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Hot Work Permit Requirements Hot work is any activity that produces a possible source of ignition, including but not limited to, welding activities, torch cutting, flame heating, and brazing. Any time hot work is to be performed within a confined space, additional hazards exist. These hazards must be recognized and controlled. The hot work permit is part of the initial entry permit. The hazards presented by hot work include oxygen deficiency or enrichment and flammable or toxic atmospheres, dependent upon the activity conducted in the space. To ensure that all hot work related hazards have been recognized and controlled, a hot work permit is required as part of the original Entry Permit. The permit will address concerns such as atmospheric monitoring, ventilation, fuel management, fire control, and control measures for any other recognized hazards. (Reference Illustration 7 – Confined Space Entry Hot Work Permit)

Entry Log The Entry Log is an integral part of the permit process and provides ongoing documentation of conditions in the space and accountability for authorized entrants. The log must identify the entry supervisor, attendant, and all entrants as well as document the results of all monitoring efforts. (Reference Illustration 4 – Individual Confined Space Entry Log)

Entry Requirements Entry into any permit space requires at least one *attendant* outside the space. *Atmospheric testing* must be conducted prior to entry and monitoring must occur during the work process. The space must be *isolated from serious hazards* such as electrical and mechanical hazards through Lockout/Tagout procedures (Refer to the OR WA Control of Hazardous Energy Program). Chemical or gas hazards must be isolated by such means as blanking and blinding, misaligning or removing sections of lines or ducts, or a double block and bleed system. Barriers, as necessary must be provided around the permit space opening to protect all other employees. Measures must be taken to prevent unauthorized entry of the space.

A *rescue service* must be readily available. All necessary equipment, including PPE will be available and employees are responsible to use all items as required.

When *hot work* is being performed (see above), a fire watch must be in place and maintained for 30 minutes following the conclusion of the work. If the hot work process is interrupted for any significant period of time, welding gas lines and/or electrical leads must be removed from the space.

### 16.10.8 Emergency and Rescue Service Requirements

Contractors hired to perform work in permit required confined spaces (PRCS) must present an emergency response plan which provides for timely rescue for workers should an emergency arise. If the contractor provides in-house rescue personnel, the contractor must verify to the agency that each member of this team has been provided personal protective and rescue equipment, (including respirators) and all required training associated with this equipment. These individuals must also receive the authorized entrants training module (OSHA) and be sufficiently trained to perform any assigned rescue duties. All rescuers must be trained and certified in first aid and cardiopulmonary resuscitation (CPR). Contractors must also ensure (show documentation) that practice rescue exercises have been performed at least yearly. Professional rescue teams (e.g., designated local fire department personnel) are specially trained and equipped to perform rescues from permit spaces. Given this high level of training, it is recommended that professional rescue teams be used to provide needed rescue service if at all possible.

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Notification The rescue service must be notified immediately in the event of an accident or injury within the confined space. Immediate notification reduces the elapsed time between employee injury and removal (rescue) from the potentially hazardous environment.

Personal Protective Equipment The Rescue Service must have the personal protective equipment required to safely and effectively perform rescues from the types of spaces encountered on site. This equipment includes, but is not limited to:

- Atmospheric Monitoring Equipment – This equipment must be capable of detecting and measuring the concentration of oxygen, flammable gases or vapors, carbon monoxide, and hydrogen sulfide.<sup>8</sup>
- Ventilation equipment – Mechanical ventilation equipment may be required, dependent upon identified atmospheric hazards.
- Type III Full-Body Harness – A full-body harness is required for all entries (except where the use of such a harness would increase the risk to the rescuer).
- Retrieval Systems – Retrieval systems may be pre-constructed or constructed in the field based on specific rescue requirements and must be capable of both horizontal or vertical retrieval based on the characteristics of the space. Mechanical advantage retrieval systems must be used for any vertical entry (descent) greater than 10 feet.
- Fall Protection – Fall protection may be pre-constructed or constructed in the field based on specific rescue requirements. Fall protection is generally required where the fall exposure exceeds 5 feet.<sup>9</sup> *(Note: Entrants shall wear a full body harness and retrieval line when working in permit required spaces. If entry requires a vertical descent of greater than five feet, a mechanical advantage retrieval system must be used, unless such use would compromise the safety of the entrant due to entanglement. Reasons of choice must be documented on the entry permit.)*
- Respiratory Protective – Options include self-contained breathing apparatus (SCBA) and supplied air breathing apparatus (air line). These apparatus must be worn when a hazardous atmosphere may be encountered.

Non-Entry Rescue Non-entry rescue is the *preferred* method for extricating incapacitated or injured entrants from confined spaces. This type of rescue should be used when this approach will not further compromise the health and safety of the entrant. Non-entry rescue methods that may be used in a specific space should be identified on the confined space entry permit.

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<sup>8</sup> Monitoring must be accomplished prior to entry.

<sup>9</sup> State OSHA (Oregon or Washington) requirements vary.

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Training Requirements Members of the rescue service must be trained to perform the functions of *Attendant* and *Entrant* as well as specific rescue functions. Each member must demonstrate competence in rescue skills.

External Rescue Service Providers These individuals (e.g., specific fire department personnel) must be informed of the hazards within the identified confined spaces and, provided access to these spaces to facilitate the development of rescue plans as well as for training purposes. The target time-frame for access and extrication of a victim in a confined space accident is 30 minutes. Rescue service providers should be capable of response to the confined space within 10 minutes from notification.

Rescue Stand-By If an entry must be made into a highly hazardous environment, the rescue service must be on-site and capable of immediate response. Examples of these types of spaces and conditions include:

- Entries during which entrants are required to wear supplied air breathing apparatus (SCBA)
- Environments in which there is a documented or potential IDLH atmosphere
- Spaces in which an entrant would be expected to have difficulty with self-rescue

Material Safety Data Sheets (MSDS) The entry supervisor must ensure that MSDS forms for any identified substances within the space are readily available for review by entrants and rescue service personnel. If an entrant or rescuer is exposed to a hazardous chemical, the MSDS must also be provided to the medical facility treating the exposed individual.

### 16.10.9 Entry Program Review and Evaluation

Specific Entry Operations Review If there is reason to believe that the measures taken under the confined space program in a particular entry operation may not have fully protected employees, a review of entry operations is required. Based on any finding of deficiencies, documentation is required and the confined space program must be revised before subsequent entries are authorized.

Examples of circumstances requiring review may be the detection of permit space hazards not previously identified on the permit; a detection of a condition prohibited by the permit; the occurrence of an injury or *near* injury during an entry; or, a change in the use or configuration of a permit space. Other circumstances may apply. (Refer to 29 CFR 1910.146 - *Permit Required Confined Space*.)

Annual Review Cancelled entry permits must be retained for at least one year following each entry. An annual review of the permits is necessary as a component of program review and evaluation. The entry program may be reviewed as necessary to ensure that employees participating in entry operations are protected from permit space hazards. As confined spaces are identified, the inventory will be updated.

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**Acceptable Entry Conditions** These are conditions that must exist in a permit required confined space to ensure that the employees involved with an entry can safely enter into and work within the space

**Attendant** An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all duties assigned

**Authorized Entrant** An individual who is authorized to enter a permit space

**Blanking or Blinding** The act of closing a pipe, line or duct by completely covering the bore with a solid plate that prevents it from leaking

**Double Block and Bleed** The closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves

**Engulfment** A liquid or a mixture such as fine sand or grain that can surround and bury, smother, strangle, or crush a person

**Entrapping Design** Space whose walls converge inward or whose floor slopes and tapers down

**Entry Permit** A written or printed document that is provided by the employer to allow and control entry into a permit space and which contains the information required by policy

**Entry** Passing through an opening (breaking the plane) into a permit required confined space and performing work

**Entry Supervisor** A person responsible for determining acceptable entry conditions, handling the entry permit, overseeing operations and terminating entry when required

**Hot Work Permit** A written authorization to perform operations (such as welding, cutting, burning, or riveting) capable of providing a source of ignition

**Immediately Dangerous to Life or Health (IDLH)** Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects

**Inerting** The displacement of atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is non-combustible<sup>10</sup>

**Non-Permit Confined Space** A space that does not contain any physical hazards or any actual or potential atmospheric hazards capable of causing death or serious physical harm

**Oxygen Deficient/Enriched Atmosphere** An atmosphere containing less than 19.5% or more than 23.5% oxygen by volume

**Retrieval System** Equipment used for non-entry rescues from permit space (e.g., retrieval line, chest or full-body harness, wristlets, and/or a lifting device or anchor)

**Toxicity** Capable of poisoning by inhalation of a gas or vapor – or – by contact with the skin, eyes, or mucous membranes

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<sup>10</sup> Note that this procedure produces an IDLH oxygen-deficient atmosphere.



**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Confined Space Inventory Form**  
**Example**

<b>Facility</b>	<b>Confined Space Location**</b>	<b>Confined Space Type</b>	<b>Examples of Hazard Types*</b>
Tanks: Fuel	Range Allotments; Fire Center; Permittees	Tanks	O, F, E
Tanks: Water	Range Allotments; Fire Center; Permittees	Tanks	O, F
Vault & Pit Toilets	Mines; Campgrounds	Vaults and Pits	O, F, B, E
Fire Truck Tanks	Fire Center/Camp	Tanks (mobile-water)	O, F
Water Pipe Vault	Campgrounds	Vault	O, B
Mine Shafts	Mines; active or abandoned	Mines; shafts	O, F, B, E

**\*Example Legend:** B = Biological Hazard (Infectious Disease Hazard/ Bacterial or Viral)  
C = Collapse/Cave-in  
E = Explosion/Fire  
F = Fumes (toxic or other hazardous materials)  
O = Oxygen Deficiency

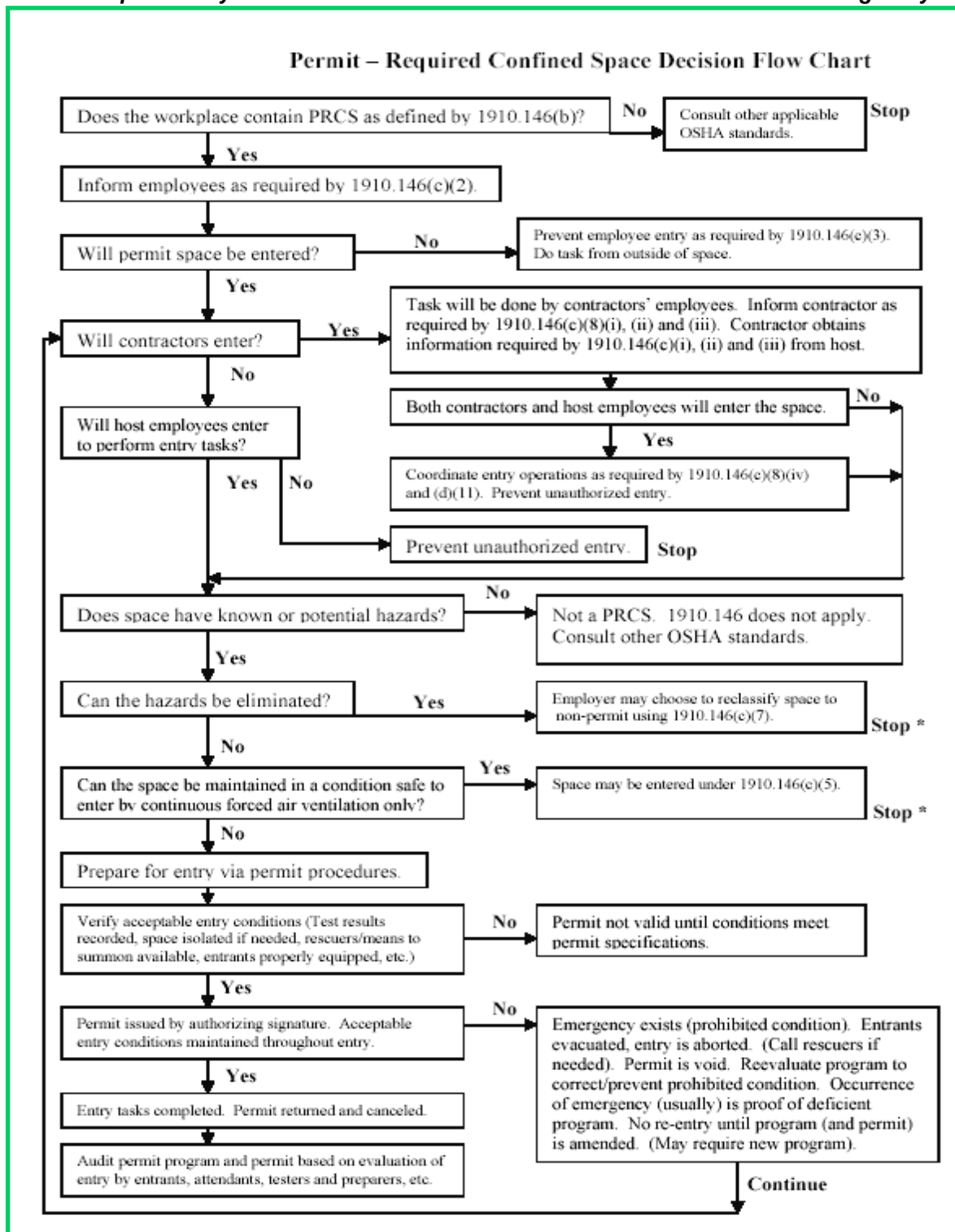
Additional hazards may be present.

**\*\*Note specific locations for each type.**

# H-1112-1 SAFETY AND HEALTH MANAGEMENT

[Source: 29 CFR 1910.146 – Appendix A]

*\*Note: Spaces may have to be evacuated and re-evaluated if hazards arise during entry.*



**H-1112-1 SAFETY AND HEALTH MANAGEMENT  
Confined Space Program Annual Review Form  
Example**

*(Information may be added as necessary and desired.)*

**Date Of Review** \_\_\_\_\_

**District** \_\_\_\_\_

October \_\_\_\_ September \_\_\_\_ *(indicate Fiscal Year)*

Number of **ENTRY PERMITS** issued: \_\_\_\_\_

Permit #1 – Issued to: \_\_\_\_\_ Date: \_\_\_\_\_

Permit #2 – Issued to: \_\_\_\_\_ Date: \_\_\_\_\_

Number of **CANCELLED PERMITS**: \_\_\_\_\_

Number of BLM employees who participated in entry operations: \_\_\_\_\_

\*Employee Name(s): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\*Identify employee(s) as entrant, attendant, or entry supervisor.

**Comments:**

I certify that the above information is complete and correct. All employees who have participated in entry activities have been provided training and information in accordance with OSHA requirements and this policy. Any contractors entering confined spaces have been debriefed regarding the requirements of the permit space program. Hazards confronted or created in permit spaces during entry operations have been identified by the contractor and discussed with the agency.

**SIGNATURE** \_\_\_\_\_ **DATE** \_\_\_\_\_

*Permits must be retained for three years from date of issue.*

**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Individual Confined Space Entry Log**  
**Example**

<b>Location:</b>		
<b>Purpose of Entry:</b> (Indicate if contractor: Identify COR contact))		
<b>Date and Duration</b>		
<b>Attendant(s)</b>		<b>Supervisor</b>
<b>Entrant Name</b>	<b>Entrant Name</b>	<b>Atmospheric Monitoring</b> (show results)
		O2 LEL CO H2S
		O2 LEL CO H2S
		O2 LEL CO H2S
		O2 LEL CO H2S

**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Confined Space Entry Permit *(Post at entry portal)***  
**Example A**

<b>Location</b> (Facility - Project)																	
<b>Purpose of Entry</b>	<b>Date and Duration</b> _____ (Entry/Exit Times) _____																
<b>Entrants</b> _____ _____	<b>Attendants</b> _____ _____																
<b>Entry Supervisor</b>	<b>Monitoring Equipment Calibration</b> (date and time)																
<b>Known Hazards and Special Precautions</b> (Note MSDS availability)																	
<b>Special Requirements and Control Measures</b> (Check those that apply. Note information on reverse.) <table border="0"> <tr> <td>___ Lockout/Tag out</td> <td>___ Blinding/Blanking</td> <td>___ Ventilation/Fans</td> </tr> <tr> <td>___ Purging</td> <td>___ Personal Protective Equipment</td> <td>___ Retrieval Lines</td> </tr> <tr> <td>___ Disconnect Lines</td> <td>___ Lighting</td> <td>___ Inerting</td> </tr> <tr> <td>___ Atmospheric (Respirators Required?)</td> <td>___ Tripod/Hoisting Equipment</td> <td>___ Fire Extinguishers</td> </tr> <tr> <td>___ Communication Equipment/Method</td> <td>___ Emergency Plan/Equipment</td> <td>___ Other (list)</td> </tr> </table>			___ Lockout/Tag out	___ Blinding/Blanking	___ Ventilation/Fans	___ Purging	___ Personal Protective Equipment	___ Retrieval Lines	___ Disconnect Lines	___ Lighting	___ Inerting	___ Atmospheric (Respirators Required?)	___ Tripod/Hoisting Equipment	___ Fire Extinguishers	___ Communication Equipment/Method	___ Emergency Plan/Equipment	___ Other (list)
___ Lockout/Tag out	___ Blinding/Blanking	___ Ventilation/Fans															
___ Purging	___ Personal Protective Equipment	___ Retrieval Lines															
___ Disconnect Lines	___ Lighting	___ Inerting															
___ Atmospheric (Respirators Required?)	___ Tripod/Hoisting Equipment	___ Fire Extinguishers															
___ Communication Equipment/Method	___ Emergency Plan/Equipment	___ Other (list)															
<b>Additional Permit Required</b> (E.g., Hot work)																	
<b>Issued By</b>	<b>Date</b>																

**Illustration 5-2**  
**(16.10-5)**

**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Confined Space Entry Permit Atmospheric Test Results/Values**  
**Example A**

<b>Initial Atmospheric Testing</b> (Pre-entry) (*Recheck following any required ventilation modification.)	<b>Time</b> _____														
<table style="width: 100%;"><tr><td style="width: 45%;">Oxygen _____%</td><td style="width: 55%;"><b>NOTES:</b></td></tr><tr><td>Explosive _____% LFL/LEL</td><td></td></tr><tr><td>Toxic _____ H<sub>2</sub>S (Hydrogen Sulfide) (ppm)</td><td></td></tr><tr><td>_____ Me (Methane) (ppm)</td><td></td></tr><tr><td>_____ CO (Carbon Monoxide) (ppm)</td><td></td></tr><tr><td>_____ % HCN-CN (Hydrogen Cyanide – cyanide gas)</td><td></td></tr><tr><td>Other _____ (E.g., Biological Hazards, dusts, irritant or corrosive vapors – Identify and list on reverse)</td><td></td></tr></table>		Oxygen _____%	<b>NOTES:</b>	Explosive _____% LFL/LEL		Toxic _____ H <sub>2</sub> S (Hydrogen Sulfide) (ppm)		_____ Me (Methane) (ppm)		_____ CO (Carbon Monoxide) (ppm)		_____ % HCN-CN (Hydrogen Cyanide – cyanide gas)		Other _____ (E.g., Biological Hazards, dusts, irritant or corrosive vapors – Identify and list on reverse)	
Oxygen _____%	<b>NOTES:</b>														
Explosive _____% LFL/LEL															
Toxic _____ H <sub>2</sub> S (Hydrogen Sulfide) (ppm)															
_____ Me (Methane) (ppm)															
_____ CO (Carbon Monoxide) (ppm)															
_____ % HCN-CN (Hydrogen Cyanide – cyanide gas)															
Other _____ (E.g., Biological Hazards, dusts, irritant or corrosive vapors – Identify and list on reverse)															
<b>Periodic Atmospheric Test(s)</b>															
(*Number of testing efforts depends upon length of entry time. Perform additional tests as required.)															
<table style="width: 100%;"><tr><td style="width: 45%;">Oxygen _____%</td><td style="width: 55%;"><b>NOTES:</b></td></tr><tr><td>Explosive _____% LFL/LEL</td><td></td></tr><tr><td>Toxic _____ H<sub>2</sub>S (Hydrogen Sulfide) (ppm)</td><td></td></tr><tr><td>_____ Me (Methane) (ppm)</td><td></td></tr><tr><td>_____ CO (Carbon Monoxide) (ppm)</td><td></td></tr><tr><td>_____ % HCN-CN (Hydrogen Cyanide – cyanide gas)</td><td></td></tr><tr><td>Other _____ (E.g., Biological Hazards, dusts, irritant or corrosive vapors – Identify and list on reverse)</td><td></td></tr></table>		Oxygen _____%	<b>NOTES:</b>	Explosive _____% LFL/LEL		Toxic _____ H <sub>2</sub> S (Hydrogen Sulfide) (ppm)		_____ Me (Methane) (ppm)		_____ CO (Carbon Monoxide) (ppm)		_____ % HCN-CN (Hydrogen Cyanide – cyanide gas)		Other _____ (E.g., Biological Hazards, dusts, irritant or corrosive vapors – Identify and list on reverse)	
Oxygen _____%	<b>NOTES:</b>														
Explosive _____% LFL/LEL															
Toxic _____ H <sub>2</sub> S (Hydrogen Sulfide) (ppm)															
_____ Me (Methane) (ppm)															
_____ CO (Carbon Monoxide) (ppm)															
_____ % HCN-CN (Hydrogen Cyanide – cyanide gas)															
Other _____ (E.g., Biological Hazards, dusts, irritant or corrosive vapors – Identify and list on reverse)															

**Testing Equipment Used (Type)** \_\_\_\_\_

**Date Calibrated** \_\_\_\_\_

**Signature of Tester** \_\_\_\_\_ **Date** \_\_\_\_\_

**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Confined Space Profile (Post at entry portal)**  
**Example B**

<b>General Information</b>		
District Office		Contact
Location of Confined Space		
Evaluated by:	Title	Date
<b>Status</b>		
( ) Permit Required ( ) Non-Permit Required ( ) Reclassified On (Date) / /		
<b>Type of Confined Space</b>		
( ) Pit ( ) Utility Vault ( ) Septic Tank ( ) Storage Tank ( ) Other _____		
<b>Potential Hazards Associated with the Confined Space</b>		
( ) Flammable Atmospheres	( ) Airborne Combustible Dust	( ) Oxygen Deficient Atmosphere
( ) Toxic Atmospheres	( ) Engulfment Hazard	( ) Falling Objects
( ) Extremely Cold	( ) Extremely Hot	( ) Other
( ) Slick/Wet Surfaces	( ) Electrical Shock	( ) Other
( ) Potential for Slip/Falls	( ) Other	( ) Other
<b>Entry Information</b>		
Proposed Number of Entry Times per Year		Entry/Egress Location
Proposed Number of Employees Entering the Space: ( ) Regular Entrants ( ) Different Entrants (Identify if employees or contractors)		
Work within the Confined Space (Statement of Work)		
<b>Initial Atmospheric Testing</b>		
Oxygen Results (%)	Location	Time _____ am/pm
LEL Results (%)	Location	Time _____ am/pm
CO Results (ppm)	Location	Time _____ am/pm
H2S Results (ppm)	Location	Time _____ am/pm
Sketch Area or Remarks:		

**Illustration 6-2**  
**(16.10-6)**

**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Confined Space Permit (*Post at entry portal*)**  
**Example B**

<b>General Information</b>			
Field Office		Location	
Date/Time Permit Issued    /    /    _____		Date/Time Permit Expires    /    /    _____	
Entry Type    ( ) Permit Required    ( ) Reclassification [Notes: _____]			
Name of Attendant		Name of Entry Supervisor	
Number of Allowed Authorized Entrants			
Specific Tasks Pertaining to the General Purpose of Entry			
Equipment Type		Model #	Calibration Date    /    /
<b>Initial Atmospheric Testing/Testing During Entry Operations</b>			
Oxygen Results (%) _____	Location	Time _____	Tester's Initials _____
LEL Results (%) _____	Location	Time _____	Tester's Initials _____
CO Results (ppm) _____	Location	Time _____	Tester's Initials _____
H2S Results (ppm) _____	Location	Time _____	Tester's Initials _____
<b>Nature of Hazards within the Permit-Required Confined Space</b>			
( ) Oxygen Deficient [<19.5%]	( ) Oxygen Enriched [>23.5%]	( ) Flammable gas [>10% LEL]	
( ) Airborne Combustible Dust	( ) Falling/Tripping Hazards	( ) Rodents/Snakes/Spiders	
( ) Electrical Hazards	( ) Moving Parts	( ) Other _____	
<b>Measures to be Used to Isolate/Eliminate/Control Permit Space Hazards</b>			
( ) Forced Air Ventilation	( ) Lockout/Tag Out Procedures	( ) Continuous Monitoring	
( ) Barriers (Employee/Vehicle)	( ) Entrance Opening Guarded	( ) Other _____	
<b>Equipment Required for Entry</b>			
( ) Personal Monitoring Equipment	( ) Ventilation Equipment	( ) Lighting	
( ) Communications	( ) Other _____	( ) Other _____	
Explanatory Statements:			
<b>Rescue and Emergency Services</b>			
Specify Emergency Plan and Contacts:			

**Entry Supervisor Signature** \_\_\_\_\_



**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Confined Space Entry Hot Work Permit**  
**Example (Post at entry portal)**

<b>Location</b>	
<b>Type/Purpose of Hot Work</b>	<b>Date/Duration</b>
<b>Ventilation</b>  ___ Forced Air Ventilation  ___ Other (specify)  Notes:	<b>Fuel Management</b>  ___ Inside Confined Space  ___ Within 35 feet  Notes:
<b>Fire Control Equipment</b>  ___ Class ABC Fire Extinguisher  ___ Class BC Fire Extinguisher  ___ Class A Fire Extinguisher	<b>Control of Other Hazards</b>  ___ Compressed Gas Cylinders  ___ Other
<b>Other Information</b>	
<b>Issued By</b>	<b>Date</b>

**H-1112-1 SAFETY AND HEALTH MANAGEMENT  
Specific Requirements – Oxygen in Confined Spaces**

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The Minimum legal requirements for oxygen in a confined space<sup>11</sup> is  
19.5% by volume (at sea level conditions).

The oxygen content of normal air at sea level conditions is approximately 20.9%.

<b>Atmospheric Oxygen Content (percent by Volume) And Expected Physiological Effects <sup>12</sup></b>	
<b>Oxygen Volume Percent At Sea Level</b>	<b>Physiological Effects</b>
16 – 18%	Inability to concentrate; euphoria; giddiness
12 – 16%	Loss of peripheral vision; increased breathing volume; accelerated heartbeat; impaired attention and thinking processes; impaired coordination
10 – 12%	Extreme lack of judgment; poor muscular coordination; intermittent respirations; marked weakness; fatigue
6 – 10%	Nausea, vomiting, inability to perform directed movements, unconsciousness and possible death
Less than 6%	Spasmodic breathing; convulsive movements; imminent death
Less than 4%	Immediate unconsciousness and death

<sup>11</sup> Other areas may be unventilated cellars, wells, mines, ship holds, tanks, burning buildings, and enclosures containing inert atmospheres.

<sup>12</sup> These physiological effects may occur under any circumstances where the oxygen content of breathable air is reduced to above percentages (e.g., significant elevation increases when hiking or mountain climbing) [Other serious medical conditions may result during these activities.]

## **H-1112-1 SAFETY AND HEALTH MANAGEMENT**

### **Confined Space Entry – Assigned Duties**

---

#### **Authorized Entrant**

Authorized entrants are required to:

- Know space hazards, including information on the means of exposure [e.g., inhalation or dermal absorption; signs and symptoms and consequences of an exposure]
- Use appropriate personal protective equipment properly
- Maintain communication with attendants as necessary to enable monitoring status and alert ability for evacuation measures when required
- Exit from the permit space as soon as possible when:
  - ✓ Ordered by the authorized person (attendant or supervisor)
  - ✓ When warning signs or symptoms of exposure are recognized
  - ✓ A prohibited condition exists
  - ✓ An automatic alarm is activated
- Alert the attendant when a prohibited condition exists or when warning signs or symptoms of exposure are noticed

#### **Attendant**

The attendant is required to:

- Remain outside the permit space during entry operations unless relieved by another authorized attendant
- Perform non-entry rescues when specified by accepted rescue procedures
- Know existing and potential hazards including information on the mode of exposure, signs and symptoms of various types of exposures, and consequences and physiological effects that may result
- Maintain communication with, and, keep an accurate account of those workers entering the permit space
- Order evacuation of the permit space when:
  - ✓ A prohibited condition exists
  - ✓ A worker shows signs of physiological effects of hazard exposure
  - ✓ An emergency outside the confined space exists
  - ✓ The attendant cannot effectively and safely perform required duties
- Summon rescue and other services during an emergency
- Ensure that unauthorized persons stay away from permit spaces or exit immediately if they have accidentally entered the space
- Inform authorized entrants and the entry supervisor if any unauthorized person enters the permit space
- Perform no other duties that interfere with the primary duties assigned

**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Confined Space Entry – Assigned Duties**

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**Entry Supervisor**

Entry supervisors are required to:

- Know space hazards including information on the mode of exposure, signs and symptoms, and possible consequences of exposure
- Verify emergency plans and specified entry conditions such as permits, tests, procedures and equipment before allowing entry
- Terminate entry and cancel permits when entry operations are completed or if a new condition exists
- Verify that rescue services are available and that the means emergency action plan procedures are in place
- Take appropriate measures to remove unauthorized entrants
- Ensure that entry operations remain consistent with the entry permit and that acceptable entry conditions are maintained at all times

**H-1112-1 SAFETY AND HEALTH MANAGEMENT**  
**Confined Space Entry Self-Inspection Checklist**  
**EXAMPLE<sup>13</sup>**

**SELF-INSPECTION CHECKLIST**  
**CONFINED SPACES**

- \_\_\_ Are confined space thoroughly emptied of any corrosive or hazardous substances, such as acids or caustics?
- \_\_\_ Are all lines to a confined space containing inert, toxic, flammable, or corrosive materials properly locked/tagged out? Are they valved off and blanked or disconnected and separated?
- \_\_\_ Are all impellers, agitators, or other moving parts and equipment inside confined spaces locked/tagged out if they present a hazard?
- \_\_\_ Is either natural or mechanical ventilation provided prior to confined space entry?
- \_\_\_ Are appropriate atmospheric tests performed to check for oxygen deficiency, toxic substances and explosive concentrations in the confined space before entry?
- \_\_\_ Is adequate illumination provided for the work to be performed in the confined space?
- \_\_\_ Is the atmosphere inside the confined space frequently tested or continuously monitored during conduct of work? Is there an assigned safety standby employee outside of the confined space?
- \_\_\_ Is the standby employee appropriately trained and equipped to handle an emergency?
- \_\_\_ Is the standby employee prohibited from entering the confined space without lifelines and respiratory equipment?
- \_\_\_ Is approved respiratory equipment required if the atmosphere inside the confined space cannot be made acceptable?
- \_\_\_ Before gas welding or burning is started in a confined space, are hoses checked for leaks, compressed gas bottles forbidden inside the space, torches lighted only outside, and the area tested for an explosive atmosphere each time before a lighted torch is to be taken into the space?
- \_\_\_ If employees will be using oxygen-consuming equipment (such as torches) in a confined space, is sufficient air provided to assure combustion without reducing the oxygen concentration of the atmosphere below 19.5%?
- \_\_\_ Whenever combustion-type equipment is used in the space, are provision made to ensure the exhaust gases are vented to the outside?
- \_\_\_ Is each confined space checked for decaying vegetation or animal matter which may produce methane?
- \_\_\_ If the confined space is below the ground and near areas where motor vehicles will be operating, is it possible for vehicle exhaust or carbon monoxide to enter the space during the work effort?

<sup>13</sup> This checklist is not all inclusive and is intended as a general guideline only.